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ŒDEMA OF THE FEET AND LEGS DUE TO THE EXCESSIVE INGESTION OF SODIUM CHLORIDE.

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DURING the last three years, particular attention has been paid to the investigation of the relation between dropsy and the retention of chlorides in the tissues, many valuable observations having been recorded by Widal and Javal and other French writers.

It has been shown in a definite manner that the question of chloride ingestion and retention has a very important influence on the production of anasarca. It has also been demonstrated that in health an excessive ingestion of chlorides may lead to an increase in the weight of the body, as a result of the tissues retaining more fluid than under normal conditions.

The following case, which recently came under my notice, takes us a step further, and demonstrates the fact that the taking of an excessive amount of chloride by a healthy individual may not only lead to retention of fluid in the tissues and a consequent increase in weight, but may be followed by well-marked œdema of the lower extremities.

The patient is a medical man, aged 40, who consulted me on account of œdema of his feet and legs. He had always led a healthy active life. He had been abroad a good deal, but had never suffered from malaria, rheumatism, or any other serious disease. For many years, however, he had been troubled with varicose veins in his legs, but none of them have ever been thrombosed, and, until quite recently, he had not noticed any swelling and œdema of his feet and legs. At the time he first observed the œdema he also complained of a feeling of heaviness in his legs and slight weakness.

Being alarmed on account of these symptoms, and, having visions in his mind of cardiac or renal disease, he came to see me for an opinion as to the cause of the œdema.

I examined him very carefully but failed to find any sign of

organic disease to account for the trouble. The pulse was 80, regular, and of normal tension. The cardiac impulse was in its natural position and the heart-sounds were normal. The liver and spleen were not enlarged, the kidneys were not palpable and there was no ascites.

The knee-jerks were normal, and so were the plantar reflexes. There was no tenderness of either muscles or nerves.

The superficial veins of the legs were enlarged and somewhat varicose. There was no evidence of thrombosis of the femoral or iliac veins.

The inguinal glands were not enlarged.

The urine was of a natural colour, it was slightly acid, and it contained neither albumen nor sugar. The specific gravity was 1028.

Thus, not finding any cause for the marked œdema of his feet and legs, and remembering the importance which has been attached of late to the ingestion and retention of chlorides in relation to anasarca, I questioned him as to diet, and was astonished to find what an enormous quantity of salt he was accustomed to take with his meals. He admitted even taking salt with bacon and salt fish, and stated that it was no unusual occurrence for him to empty the salt-cellar both at luncheon and at dinner. I calculated that on an average he was taking from 300 to 600 grains of salt a day instead of the average 150 grains. That he was taking an excessive amount of salt was proved by the analysis of his urine, which was found to contain 1·86 per cent. of chlorides, *i.e.*, nearly three times the normal amount.

I advised him to decrease, at once, his daily amount of sodium chloride. This he did, but when I saw him about a week after, he said he had become so accustomed to taking large quantities of salt with his meals, that he was no longer able to enjoy his food, and, that in consequence, he had been obliged to entirely reorganise his diet by substituting sweets and pastry for meat and fish. The salt was so necessary an adjunct to the enjoyment of his food that he stated he would willingly give up tobacco, sugar and alcohol, but that salt he must have. He, however, agreed to cut it down as much as possible. At the end of a week, there was an appreciable

decrease in the amount of œdema, and after three weeks it had almost disappeared.

Another urinary analysis was made at this time, and it was found that the sodium chloride had dropped to ·98 per cent.

I have no doubt the œdema of the legs was due to the enormous chloride ingestion and consequent excessive retention in the tissues, through the inability of the kidneys to deal adequately with such large quantities.

Widal and Javal found that, in cases of interstitial nephritis, doses of sodium chloride up to 150 grains did not give rise to œdema, but, in cases of parenchymatous nephritis, the result was different, œdema being produced. They found that the chlorides were not excreted entirely, and that, as a result of their retention, the fluid in the tissues was retained. They further showed that, by increasing the amount of chlorides in the diet, the œdema increased, but, on the other hand, if the ingestion of chlorides was diminished the tissues were drawn upon for their reserve chlorides, and, as they were used up, the œdema disappeared. They also demonstrated that there was a definite relation between the hydration of the body and chloride retention, by changing three men suddenly from a diet rich in chlorides to one almost devoid of chlorides, the result being a marked reduction of the body weight of four or five pounds. Unfortunately, I did not weigh my patient before and after the change in his diet, and so can express no definite opinion as to its effect on his body weight. He himself was under the impression that he had lost weight as a result of the treatment.

This case exemplifies the great importance of investigating and regulating the diet with regard to the chloride ingestion in cases of dropsy, not only from the point of view of treatment, but also of diagnosis. I have not been able to find a similar case recorded of a patient seeking advice for œdema of the legs, which proved to be due to an excess of sodium chloride in the diet.

The belief expressed by Widal and Javal, that the elimination of chlorides by the kidneys is a specialised function of these organs, offers the best explanation of the occurrence of œdema of the legs in this case. It might be presumed that, for a considerable time, the kidneys had been able to

deal with the excessive amount of chlorides presented to them for elimination, but it is equally reasonable to suppose that, sooner or later, there would be a limit to this overwork, followed by a breakdown if persisted in, and that it was a failure of this specialised function to continue at high pressure which led to an abnormal retention of chlorides in the tissues, and thus to the production of dropsy.

The chloride estimations were carried out for me by Mr. E. M. Lobb, to whom I am much indebted, in the Physiological Department at Guy's Hospital.

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